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(54) WATER-BASE LUBRICANT COMPOSITION AND METHOD FOR PREVENTING CORROSION OF METAL BY USING IT

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a water-base lubricant composition excellent in anticorrosiveness to a nonferrous metal such as an aluminum alloy, resistance to rotting, resistance to microbial deterioration, and shelf stability and having a good performance balance.

SOLUTION: The water-base lubricant composition contains (A) an organosilicon compound obtained by hydrolyzing 100 pts.wt. of a hydrolyzable silane containing a nitrogen-containing organic group, represented by the formula (1): YR_1mSiR_23-m (1) (wherein R_1 is a 1-8C substituted or unsubstituted monovalent hydrocarbon group; R_2 is a 1-4C alkoxy group or acyloxy group; Y is a nitrogen-containing organic group; and m is 0 or 1), or a partial hydrolyzate thereof and 5-200 pts.wt. of a hydrolyzable silane of the formula (2): R_3nSiR_44-n (2) (wherein R_3 is a 1-8C substituted or unsubstituted monovalent hydrocarbon group; R_4 is a 1-4C alkoxy group or acyloxy group; and n is 0, 1 or 2), or a partial hydrolyzate thereof; (B) a lubricant; and (C) an alkanolamine.

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(54) 【発明の名称】 水系潤滑剤組成物及びそれを用いた金属腐食防止方法

(57) 【要約】



(R¹は炭素数1～8の置換又は非置換の一面炭化水素基、R²は炭素数1～4のアルコキシ基又はアシロキシ基、Yは窒素含有有機基、nは0又は1。)の窒素原子



(R²は炭素数1～8の置換又は非置換の一面炭化水素基、R⁴は炭素数1～4のアルコキシ基又はアシロキシ基、mは0、1又は2。)の加水分解性シラン又はその部分加水分解物5～200重量部とを加水分解することによって得られる有機ケイ素化合物、(B)油性剤、

(C) アルカノールアミンを含有する水系潤滑剤組成

【解決手段】 (A) 式(1)

(1)

含有有機基を含有する加水分解性シラン又はその部分加水分解物100重量部と、式(2)

(2)

物。

【効果】 本発明の水系潤滑剤組成物は、アルミニウム合金等の非鉄金属等に対する防食性、耐腐敗性、耐微生物劣化性及び保存安定性に優れ、大変性能のバランスがよい。

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【特許請求の範囲】



(式中、R¹は炭素数1～8の置換又は非置換の一価炭化水素基、R²は炭素数1～4のアルコキシ基又はアシロキシ基、Yは窒素含有有機基であり、mは0又は1で



(式中、R³は炭素数1～8の置換又は非置換の一価炭化水素基、R⁴は炭素数1～4のアルコキシ基又はアシロキシ基、nは0、1又は2である。)で表される加水分解性シラン又はその部分加水分解物5～200重量部

- 【請求項2】 (A) 成分の有機ケイ素化合物 0、1～10重量%、
(B) 成分の油性剤 5～90重量%、
(C) 成分のアルカノールアミン 1～30重量%、
(D) 水 0、1～90重量%

を含有する請求項1記載の水系潤滑剤組成物。

【請求項3】 pHが8～13である請求項1又は2記載の水系潤滑剤組成物。

【請求項4】 請求項1乃至3のいずれか1項記載の水系潤滑剤組成物を用いて金属素材を加工又は浸漬することを特徴とする金属腐食防止方法。

【請求項5】 金属素材がアルミニウム又はアルミニウム合金素材である請求項4記載の金属腐食防止方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、水系潤滑剤組成物及び金属腐食防止方法に関し、更に詳しく言えば、アルミニウムやアルミニウム合金等の非鉄金属等に対する防食性、耐腐敗性及び耐微生物劣化性に優れた水系潤滑剤組成物、及びこの組成物を用いた金属腐食防止方法に関する。

【0002】本発明は、アルミニウム、アルミニウム合金、マグネシウム、マグネシウム合金等の非鉄金属及びその他の金属素材の切削、研削、塑性加工等に利用される。

【0003】

【従来の技術及び発明が解決しようとする課題】アルミニウム合金等の非鉄金属の腐食を抑制する化合物としては、リン酸エステル、アミド化合物等が知られている。

【0004】しかし、これら化合物を水系潤滑剤に適用した場合、防食効果は少ない。更に、切削、研削等に使用される水系潤滑剤では、一般に水希釈液として使用されるが、その液のpHは一般にアルカリ側であり、pHが9以上になるとアルミニウム合金等の非鉄金属の腐食が起こる。その結果、pHを9以下に抑えなければなら



(式中、R¹は炭素数1～8の置換又は非置換の一価炭化水素基、R²は炭素数1～4のアルコキシ基又はアシロキシ基、Yは窒素含有有機基であり、mは0又は1で

【請求項1】 (A) 下記一般式(1)
(1)

ある。)で表される窒素原子含有有機基を含有する加水分解性シラン又はその部分加水分解物100重量部と、
下記一般式(2)

(2)

とを加水分解することによって得られる有機ケイ素化合物、(B)油性剤、(C)アルカノールアミンを含有することを特徴とする水系潤滑剤組成物。

ず、耐腐敗性、防錆性が低下する。更にリン酸エステル等のリンを含有する水溶性潤滑剤では、微生物による劣化が早いという問題点がある。

【0005】また、特開昭61-60766号公報及び特開平9-194872号公報では、上記のような問題点を解決すべく、シランカップリング剤のような有機基含有アルコキシシラン化合物を添加する方法を開示している。しかし、これらはモノマー成分であるため、切削中に成膜化しづらく、初期の防食効果はあるが、その持続性が悪いという欠点がある。また、その効果を高めるため、シラン化合物成分を多量に潤滑剤内に添加すると系内がアルカリ性であるため、すぐにゲル化し、今度は保存安定性が悪化するという問題があった。

【0006】従って、アルミニウム合金等の非鉄金属等に対する防食性や耐腐敗性及び耐微生物劣化性に優れ、保存安定性も良好な水系潤滑剤組成物は未だ見出されていないのが実情である。

【0007】本発明は、上記問題点を解決し、アルミニウム合金等の非鉄金属等に対する防食性、耐腐敗性、耐微生物劣化性及び保存安定性に優れた水系潤滑剤組成物及びこれを用いた金属腐食防止方法を提供することを目的とする。

【0008】

【課題を解決するための手段及び発明の実施の形態】本発明者らは、上記目的を達成すべく、非鉄金属に対する防食性、耐腐敗性、耐微生物劣化性及び保存安定性に優れた化合物を鋭意探索した結果、特定の有機ケイ素化合物が優れた性能を有することを見出し、本発明を完成するに至った。

【0009】即ち、本発明者らは、下記一般式(1)
(1)

ある。)で表される窒素原子含有有機基を含有する加水分解性シラン又はその部分加水分解物100重量部と、
下記一般式(2)

(2)

$$\text{H}_2\text{NCH}_2-, \text{H}(\text{CH}_3)\text{NCH}_2-, \text{H}_2\text{NCH}_2\text{CH}_2-, \text{H}(\text{CH}_3)\text{NCH}_2\text{CH}_2-, \text{H}_2\text{NCH}_2\text{CH}_2\text{C}$$

【化5】

【0027】上記加水分解性シラン(a)、(b)又はそれらの部分加水分解物を用いて加水分解し、本発明の有機ケイ素化合物を得る場合、溶媒は主として水を使用するが、必要に応じて、水と溶解する有機溶媒であるアルコール、エステル、ケトン、グリコール類を水に添加する形を用いることができる。有機溶媒としては、メチ

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ルアルコール、エチルアルコール、1-ブロピルアルコール、2-ブロピルアルコール等のアルコール類、酢酸メチル、酢酸エチル、アセト酢酸エチル等のエステル類、アセトン、メチルエチルケトン等のケトン類、グリセリン、ジエチレングリコール等のグリコール類などを挙げることができる。

【0028】溶媒の量は原料シラン100重量部に対して400～5,000重量部が好ましい。更に好ましくは1,000～3,000重量部である。溶媒の量が400重量部より少ないと反応が進行しすぎ、系が均一にならない場合がある。また液の保存安定性も悪くなる場合がある。一方、5,000重量部より多いと経済的に不利な場合が生じる。

【0029】また、溶媒中の水の量は、水/原料シランのモル比率で5〜50が好ましい。このモル比率がより少ないと加水分解が完全に進行しにくく、液の安定性が悪化する場合がある。一方、50を超えると経済的に不利な場合が生じる。

【0030】反応方法としては、（１）混合シランを水中に或いは加水分解に必要である以上の量の水を含む有機溶剤中に滴下する方法、（２）混合シラン或いは有機溶剤含有混合シラン中に水を滴下する方法、（３）加水分解性シラン（ｂ）又はその部分加水分解物を水中に或いは加水分解に必要である以上の量の水を含む有機溶剤中に滴下し、その後、窒素原子含有有機基を含有する加水分解性シラン（ａ）又はその部分加水分解物を滴下する方法、（４）窒素原子含有有機基を含有する加水分解性シラン（ａ）又はその部分加水分解物を水中に或いは加水分解に必要である以上の量の水を含む有機溶剤中に滴下し、その後、加水分解性シラン（ｂ）又はその部分加水分解物を滴下する方法などが挙げられるが、有機キレート化合物の安定性の点から、特に（１）の反応方法が好ましい。

【0031】なお、得られた有機ケイ素化合物は水溶液の形で得られるが、必要に応じて、更に水を加えて、除去したして、有機ケイ素化合物100重量部に対して水10～2,000重量部、好ましくは10～1,000重量部の比率に調整することにより、有機ケイ素化合物を形成することができる。この場合、水の量が100重量部より少ないと有機ケイ素化合物自体の保存安定性が悪化する場合がある。また、2,000重量部より多いと有機ケイ素化合物を加える量が多くなってしまい、コストに対して好しくない。

【0032】このようにして得られた有機ケイ素化合物は保存安定性も高く、特にアルカリ性領域にある水系潤滑剤組成物などに添加剤として加えても安定に存在することができ、更には防食性、耐腐敗性及び耐微生物劣化性等の諸性能を付与することが可能である。

【0033】本発明の水系潤滑剤組成物は、上記有機ケイ素化合物、油性剤、アルカノールアミン及び水を含む。

が、この有機ケイ素化合物は、組成物全体の0.1~10重量%、より好ましくは0.1~5重量%、更に好ましくは0.2~3重量%であることが好ましい。

【0034】油性剤の配合量は、5～90重量%、より好ましくは10～70重量%、更に好ましくは20～50重量%、特に好ましくは20～40重量%であり、アルカノールアミンは、1～30重量%、より好ましくは3～25重量%、更に好ましくは5～20重量%であることが好ましい。

【0035】有機機イ素化合物が少なすぎると、その配合効果が十分得られず、多すぎるとコスト増大を招くおそれがある。油性剤が少なすぎると、潤滑性を不足するおそれあり、多すぎると、組成物の安定性が損なわれるおそれがある。アルカノールアミンが少なすぎると、耐腐敗性が不足する場合が生じ、多すぎると、皮膚刺激性が強くなるおそれがある。

【0036】なお、水の含有量は、0.1～90重量%、好ましくは0.5～80重量%、特に好ましくは1～70重量%である。水の量が少なすぎると(A)成分の安定性が悪くなることあり、多すぎると潤滑性や金属腐食防止性が不十分となることがある。

〔10037〕上記油性剤としては、(1)カプリン酸、ラウリン酸、ミリスチン酸、パルミチン酸、ステアリン酸、アラキジン酸、ペヘン酸、オレイン酸、エルシン酸、リノール酸、リノレン酸、リシノレイン酸、エリオステリン酸等の脂肪酸、(2)ゴマ油、ナタネ油、(3)カウ油、綿実油、胚油、牛脂、羊脂等のエステル、(4)ラウリルアルコール、ミリスチルアルコール、セチルアルコール、ステアリルアルコール、オレイルアルコール等の高級アルコール等を挙げることができる。また、高級脂肪酸に加えて、ドデカン二酸、カプリン酸程度の中級脂肪酸を配合してもよい。油性剤としては、特に(1)の炭素数が12以上、好ましくは12〜50、より好ましくは12〜36、更に好ましくは12〜24、特に16〜18の脂肪酸(RCOOH)やアルコール(ROH)が好ましい。

【0038】アルカノールアミンとしては、モノエタノールアミン、ジエタノールアミン（DEA）、トリエタノールアミン（TEA）等が挙げられ、これらの1種を単独で又は2種以上を組み合わせる用いることができる。

【103931】本、本組成物には、基油、防錆剤、界面活性剤、防腐剤、消泡剤、及びその他の添加剤（例えば、極圧添加剤、防食剤、粘着指数向上剤、酸化防止剤、清淨分散剤、着色剤、香料等）を適宜配合して使用できる。上記基油としては、鉱油、直ばい、マシン油、タービン油、スピンドル油、シリンダー油等が挙げられる。基油を含む水溶性潤滑剤組成物としては、水溶性潤滑剤組成物を100重量部とすると場合、基油が15〜70重量部、好しくは20〜60重量部とすることが好ましい。

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部、更に好ましくは20〜50重量部とすることができ

【0040】上記防錆剤としては、上記に示すアミン化合物(アルカノールアミン)以外にも、(1)特にR'の炭素数が6〜10のカルボン酸(R'COOH)、

(2)上記カルボン酸塩(カルボン酸の金属(Ca、Mg、Al、Zn、Pb等)塩、カルボン酸とアミン(通常のモノアミン、ポリアミン、ロジンアミン、牛脂アミン等)の塩)、(3)スルホン酸塩(石油スルホン酸、ジニルナフタレンスルホン酸、重質アルキルベンゼンスルホン酸等とNa、Ca、Ba等の塩)、(4)エステル(オレイン酸、ラウリン酸等のカルボン酸とソルビトール、ペンタエリスリトール、ショ糖、グリセリン等の多価アルコールの部分エステル)、その他を挙げることができる。

【0041】上記界面活性剤としては、ノニオン系、アニオン系、カチオン系又は両性系界面活性剤を用いることができるが、ノニオン系界面活性剤が好ましい。これは、希釈液の安定性及び洗浄性のためである。ノニオン系界面活性剤では、(1)ポリオキシエチレン系化合物

(ポリオキシエチレンアルキルエーテル、ポリオキシエチレンアルキルフェニルエーテル、ポリオキシエチレンアルキルナフタリエーテル、ポリオキシエチレン化ヒマシ油、ポリオキシエチレンアビエチルアルコール、ポリオキシエチレンアルキルチオエーテル、ポリオキシエチレンアルキルアミド、ポリオキシエチレン-ポリオキシプロピレングリコール、ポリオキシエチレン-ポリオキシプロピレングリコールエチレンジアミン、ポリオキシエチレンモノ/脂肪酸エステル、ポリオキシエチレン脂肪酸エステル、ポリオキシエチレン脂肪酸エステル、ポリオキシエチレン脂肪酸エステル、ポリオキシエチレンソルビタンモノ/脂肪酸エステル、ポリオキシエチレンソルビタンジ/脂肪酸エステル、ポリオキシエチレンソルビタントリ/脂肪酸エステル等)、(2)多価アルコール系化合物及びアルキロールアミド系化合物(エチレンジグリコールモノ/脂肪酸エステル、プロピレンジグリコールモノ/脂肪酸エステル、グリセリンモノ/脂肪酸エステル、ペンタエリトリットモノ/脂肪酸エステル、ソルビタンモノ/脂肪酸エステル、ソルビタンセキス脂肪酸エステル、ソルビタントリ/脂肪酸エステル、ショ糖脂肪酸エステル、脂肪酸モノ/エタノールアミド、脂肪酸ジエタノールアミド等)を挙げることができる。

【0042】上記アニオン系界面活性剤としては、

(1)脂肪酸鹽誘導体(脂肪酸石けん、ロジン酸石けん、ナフテン酸石けん、脂肪酸サルコシド、たんばく分解物脂肪酸アミド等)、(2)硫酸エステル系化合物(長鎖アルコール硫酸エステル塩、オレフィン硫酸エステル塩、ポリオキシエチレンアルキルエーテル硫酸エステル塩、脂肪酸多価アルコール硫酸エステル塩等)、(3)スルホン酸系化合物及びリン酸エステル系化合物(アル

カンスルホン酸塩、石油スルホン酸塩、 α -オレフィンスルホン酸塩、アルキルナフタリンスルホン酸塩、アルキルリン酸エステル塩、ポリオキシエチレンアルキルフェノールエーテルリン酸エステル塩等)が挙げられる。上記ノニオン系とアニオン系の界面活性剤を併用することもできる。更に、公知のカチオン系界面活性剤、両性系界面活性剤を用いることもできる。

【0043】上記防錆剤としては、(1)フェノール系化合物(ο-フェニルフェノール、Na-ο-フェニルフェノール、2,3,4,6-テトラクロロフェノール等)、(2)ホルムアルデヒド供与体化合物(2-ハイドロキシメチル-2-ニトロ-1,3-プロパンジオール、ヘキサハイドロ-1,3,5-トリリス(2-ハイドロキシエチル)-(s)-トリアジン等)、(3)その他(トリプロモサリチルアニリドとジプロモサリチルアニリドの混合物等)を挙げることができる。

【0044】上記清泡剤としては、シリコンのエマルジョン、高級アルコール等を挙げることができる。

【0045】上記水系潤滑剤組成物は、pH8〜13、好ましくは8〜12程度に調整したものを使用することが好ましい。この場合、pH調整剤は特に制限されず、塩酸等、或いは炭酸ナトリウム、炭酸水素ナトリウム、水酸化ナトリウム等を用いることができる。

【0046】本発明の金属腐食防止方法は、上記水系潤滑剤組成物を用いて金属素材、例えばアルミニウム、アルミニウム合金、マグネシウム、マグネシウム合金等の非鉄合金等の金属素材を常法により加工又は浸漬するものである。

【0047】この場合、特にアルミニウム又はアルミニウム合金に対しては、上記有機ケイ素化合物を含有する水系潤滑剤組成物をpHがアルカリ側を示す水希釈アルカリ液を用いて、アルミニウム又はアルミニウム合金からなる金属素材を加工又は浸漬することが有効である。

【0048】

【実施例】以下、合成例及び実施例と比較例を示し、本発明を具体的に説明するが、本発明は下記の実施例に制限されるものではない。

(1)有機ケイ素化合物の合成

【合成例1】水246g(13.7mol)を攪拌機、温度計及び冷却器を備えた500mlの反応器に入れ、攪拌した。ここに $H_2NCH_2CH_2HNCH_2CH_2CH_3$ 、 $Si(OCH_3)_4$ 4.4g(0.2mol)及び $Si(OCH_2CH_3)_4$ 20.8g(0.1mol)を混合したものを室温で10分間かけて滴下したところ、25℃から56℃に内温が上昇した。更にオイルバスにて60〜70℃に加熱し、そのまま1時間攪拌を行った。次にエステルアダプターを取り付け、内温99℃まで上げ、副生したメタノール、エタノールを除去することに より、有機ケイ素化合物-1を25.0g得た。このものの不揮発分(105℃/3時間)は14.9%であ

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た。

【0049】〔合成例2〕水278g(15.4mol)を攪拌機、温度計及び冷却器を備えた500mlの反応器に入れ、攪拌した。ここに $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 5.6g(0.25mol)及び $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 10.4g(0.05mol)を混合したものを室温で10分間かけて滴下したところ、27℃から49℃に内温が上昇した。更にオイルバスにて60～70℃に加熱し、そのまま1時間攪拌を行った。次にエステルアダプターを取り付け、内温98℃まで上げ、副生したメタノール、エタノールを除去することにより、有機ケイ素化合物-2を274g得た。このものの不揮発分(105℃/3時間)は15.1%であった。

【0050】〔合成例3〕水202g(11.2mol)を攪拌機、温度計及び冷却器を備えた500mlの反応器に入れ、攪拌混合した。ここに $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 3.3g(0.15mol)及び $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 31.2g(0.15mol)を混合したものを室温で10分間かけて滴下したところ、25℃から51℃に内温が上昇した。更にオイルバスにて60～70℃に加熱し、そのまま1時間攪拌を行った。次にエステルアダプターを取り付け、内温99℃まで上げ、副生したメタノール、エタノールを除去することにより、有機ケイ素化合物-3を210g得た。このものの不揮発分(105℃/3時間)は15.3%であった。

【0051】〔合成例4〕水308g(17.1mol)を攪拌機、温度計及び冷却器を備えた500mlの反応器に入れ、攪拌混合した。ここに $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 5.3g(0.2mol)及び $\text{Si}(\text{OCH}_3)_4$ 15.2g(0.1mol)を混合したものを室温で10分間かけて滴下したところ、28℃から53℃に内温が上昇した。更にオイルバスにて60～70℃に加熱し、そのまま1時間攪拌を行った。次にエステルアダプターを取り付け、内温99℃まで上げ、副生したメタノールを除去することにより、有機ケイ素化合物-4を300g得た。このものの不揮発分(105℃/3時間)は15.4%であった。

【0052】〔合成例5〕水253g(14.1mol)を攪拌機、温度計及び冷却器を備えた500mlの反応器に入れ、攪拌混合した。ここに $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 4.4g(0.2mol)及び $\text{CH}_3\text{Si}(\text{OCH}_3)_3$ 13.6g(0.1mol)を混合したものを室温で10分間か

けて滴下したところ、26℃から42℃に内温が上昇した。更にオイルバスにて60～70℃に加熱し、そのまま1時間攪拌を行った。次にエステルアダプターを取り付け、内温99℃まで上げ、副生したメタノールを除去することにより、有機ケイ素化合物-5を244g得た。このものの不揮発分(105℃/3時間)は15.6%であった。

【0053】〔合成例6〕水241g(13.4mol)を攪拌機、温度計及び冷却器を備えた500mlの反応器に入れ、攪拌混合した。ここに $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 4.4g(0.2mol)、 $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 18.7g(0.09mol)及び $\text{CH}_3\text{Si}(\text{OCH}_3)_3$ 1.4g(0.01mol)を混合したものを室温で10分間かけて滴下したところ、26℃から49℃に内温が上昇した。更にオイルバスにて60～70℃に加熱し、そのまま1時間攪拌を行った。次にエステルアダプターを取り付け、内温99℃まで上げ、副生したメタノールを除去することにより、有機ケイ素化合物-6を241g得た。このものの不揮発分(105℃/3時間)は15.7%であった。

【0054】〔合成例7〕水246g(13.7mol)を攪拌機、温度計及び冷却器を備えた500mlの反応器に入れ、攪拌混合した。ここに $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 4.4g(0.2mol)を室温で10分間かけて滴下したところ、25℃から52℃に内温が上昇した。このまま30分間攪拌混合した後、 $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 20.8g(0.1mol)を更に滴下した。滴下後、オイルバスにて60～70℃に加熱し、そのまま1時間攪拌を行った。次にエステルアダプターを取り付け、内温98℃まで上げ、副生したメタノール、エタノールを除去することにより、有機ケイ素化合物-7を248g得た。このものの不揮発分(105℃/3時間)は14.7%であった。

【0055】(2) 水溶性潤滑剤組成物の組成
本発明の金属加工用水溶性潤滑剤の性能を明らかにするために、表1、2に示す各成分を有する実施例1～13及び比較例1～5の試料液(単位は重量部)について、以下に述べる各項目の性能試験とその評価を行った。なお、表1、2において、基油としてはスピンドル油、界面活性剤としてはノニオン系界面活性剤のポリオキシエチレンアルキルエーテル、消泡剤としてはシリコーン系消泡剤を使用した。

【0056】

【表1】

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成分(重量部)	実施例							
	1	2	3	4	5	6	7	8
サリン酸	20	20	20	20	20	20	20	25
リソリン酸	5	5	5	5	5	5	5	
DGA	12	12	12	12	12	12	12	12
TEA	5	5	5	5	5	5	5	5
有機ケイ素化合物-1	7							
有機ケイ素化合物-2		7						
有機ケイ素化合物-3			7					
有機ケイ素化合物-4				4				
有機ケイ素化合物-5					7			
有機ケイ素化合物-6						7		7
有機ケイ素化合物-7							7	
$\text{H}_2\text{NCH}_2\text{NHC}_6\text{H}_4\text{Si}(\text{OCH}_3)_3$								
$\text{Si}(\text{OCH}_3)_4$								
基剤								
ノニ系界面活性剤	2	2	2	2	2	2	2	
防腐剤	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
溶剤	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
水	50.1	50.1	50.1	55.1	50.1	50.1	50.1	50.1
pH	11.1	11.2	11.1	10.9	11.3	11.1	11.0	11.0

注：有機ケイ素化合物の添加量は、上記合成例で得られた水を含有するものとしての添加量であり、不揮発分としての添加量は、表1の添加量と各合成例での不揮発分

含有量とから求められる（以下、同様）。

【0057】

【表2】

成分(重量部)	実施例							
	9	10	11	1	2	3	4	5
サリン酸	65	40	80	20	20	20	20	20
リソリン酸	5			5	5	5	5	5
DGA	25	12	12	12	12	12	17	
TEA	5	5	5	5	5	5		20
有機ケイ素化合物-1		6	7					
有機ケイ素化合物-2								
有機ケイ素化合物-3								
有機ケイ素化合物-4	3							
有機ケイ素化合物-5								
有機ケイ素化合物-6		4						
有機ケイ素化合物-7								
$\text{H}_2\text{NCH}_2\text{NHC}_6\text{H}_4\text{Si}(\text{OCH}_3)_3$					1			
$\text{Si}(\text{OCH}_3)_4$						1	10	
基剤		15	40					
ノニ系界面活性剤	2	2	2	2	2	2	2	2
防腐剤	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
溶剤	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
水	1.1	19.1	5.1	57.1	56.1	56.1	47.1	54.1
pH	11.1	11.0	10.9	11.1	11.0	11.2	11.1	11.0

【0058】(3) 性能評価

本性能試験の試験項目及び性能評価方法は、以下の通りである。

防食性及び保存安定性

本性能試験では、アルミニウム（JIS A1050 P）及びアルミニウム合金（JIS A2017 P）のジュラルミン（Cu 4%、Mg 0.5%）の試験片（50×30×1mm）を#320研ぎ紙で研磨し、試料液の水20倍希釈液に硫酸を添加して、上記希釈液のpHを9.0に調整した後、常温で半浸漬し、24時間後の試験片の変色度合を目視で評価した。評価の表示は、◎：変色なし、○：少し変色、×：黒色に変色を表す。結果を表3に示す。また、実施例及び比較例で調製した水系潤滑剤組成物を60℃で1ヶ月保存後に再度上記と同様な防食性試験を行った。その結果も表3に示す。

耐腐敗性

本性能試験では、生菌数の測定により耐腐敗性の評価を行った。まず、試料液を水で20倍に希釈し、500mlの三角フラスコに300ml採取した。次いで、これに硫酸を添加して、上記希釈液のpHを9.0に調整した後、生菌数1×10⁷個/mlの腐敗液を5%（15ml）添加して30℃で振盪培養した。更に、試験開始後7日目、14日目に腐敗液をそれぞれ各1%（3ml）添加し、生菌数の経時的変化を観察した。その結果を表4に示す。なお、生菌数の測定はプレートカウント法により行った。

耐微生物劣化性

本性能試験では、曾田式振子型油性試験機による摩擦係数の測定により、微生物劣化試験前後の潤滑性の評価を行った。まず、試料液を水で20倍に希釈した。次いで、これに硫酸を添加して、上記希釈液のpHを9.0に調整した後、生菌数1×10⁷個/mlの腐敗液を1

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重量%添加し、30℃で1ヶ月間振盪培養して微生物劣化を促進させた後の潤滑性を評価した。結果を表5に示す。

【0059】

【表3】

	防食性(初期)		防食性(90℃/1ヶ月後)	
	75%油ム	25%油ム	75%油ム	25%油ム
実用例-1	◎	◎	◎	◎
実用例-2	◎	◎	◎	◎
実用例-3	◎	◎	◎	◎
実用例-4	◎	◎	◎	◎
実用例-5	◎	◎	◎	◎
実用例-6	◎	◎	◎	◎
実用例-7	◎	◎	◎	◎
実用例-8	◎	◎	◎	◎
実用例-9	◎	◎	◎	◎
実用例-10	◎	◎	◎	◎
実用例-11	◎	◎	◎	◎
比較例-1	×	×	×	×
比較例-2	◎	◎	×	×
比較例-3	○	○	×	×
比較例-4	◎	◎	×	×
比較例-5	○	○	○	○

【0060】

【表4】

	生菌数 (個/ml)				
	5 E	10 E	16 E	20 E	30 E
実用例-1	<10 ²	<10 ²	<10 ²	<10 ²	<10 ²
実用例-4	<10 ²	<10 ²	<10 ²	<10 ²	<10 ²
実用例-5	<10 ²	<10 ²	<10 ²	<10 ²	<10 ²
実用例-6	<10 ²	<10 ²	<10 ²	<10 ²	<10 ²
比較例-1	<10 ²	<10 ²	<10 ²	<10 ²	<10 ²
比較例-2	<10 ²	<10 ²	<10 ²	<10 ²	<10 ²
比較例-3	<10 ²	<10 ²	<10 ²	<10 ²	<10 ²
比較例-4	<10 ²	<10 ²	<10 ²	<10 ²	<10 ²
比較例-5	<10 ²	<10 ²	2×10 ²	3×10 ²	8×10 ²

【0061】

【表5】

	腐食係数	
	劣化前	劣化後
実用例-1	0.11	0.12
実用例-4	0.12	0.12
実用例-5	0.11	0.12
実用例-6	0.12	0.12
比較例-1	0.12	0.12
比較例-2	0.12	0.12
比較例-3	0.12	0.13
比較例-4	0.12	0.12
比較例-5	0.12	0.15

【0062】

【発明の効果】本発明の水系潤滑剤組成物は、アルミニウム合金等の非鉄金属等に対する防食性、耐腐敗性、耐微生物劣化性及び保存安定性に優れ、大変性能のバランスがよい。本発明の金属腐食方法によれば、アルミニウム合金等が腐食しやすいアルカリ液にて処理する場合における腐食を容易にかつ効率的に防止できる。

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]Concerning a drainage system lubricant composition and a metallic corrosion prevention method in more detail, this invention relates to the metallic corrosion prevention method using the drainage system lubricant composition excellent in the anti-corrosiveness, the putrescibility-proof, and microbial deterioration-proof nature to nonferrous metal, such as aluminum and an aluminum alloy, etc., and this constituent.

[0002]This invention is used for cutting of nonferrous metal, such as aluminum, an aluminum alloy, magnesium, and a Magnesium alloy, and other metal materials, grinding, plastic working, etc.

[0003]

[Description of the Prior Art]Phosphoric ester, an amide compound, etc. are known as a compound which controls the corrosion of nonferrous metal, such as an aluminum alloy.

[0004]However, when these compounds are applied to drainage system lubricant, there are few anticorrosive effects. In the drainage system lubricant used for cutting, grinding, etc., although generally used as a water diluent, generally the pH of the liquid is an alkali side, and if pH becomes nine or more, the corrosion of nonferrous metal, such as an aluminum alloy, will take place. As a result, pH must be suppressed to nine or less and putrescibility-proof and rust prevention fail. In the water soluble lubricants containing Lynn, such as phosphoric ester, there is a problem that degradation by a microorganism is early.

[0005]In JP,61-60766,A and JP,9-194872,A, the method of adding an organic group content alkoxy silane compound like a silane coupling agent is indicated that the above problems should be solved. However, since these are monomer components, it is [membrane-formation-] hard toize during cutting, and there is an early anticorrosive effect, but there is a fault that the durability is bad. Since the inside of a system was alkaline when a silane compound ingredient

is added in lubricant so much, in order to heighten the effect, it gelled immediately and there was a problem that preservation stability got worse shortly.

[0006]Therefore, the actual condition is that excel in the anti-corrosiveness, the putrescibility-proof, and microbial deterioration-proof nature to nonferrous metal etc., such as an aluminum alloy, and the drainage system lubricant composition with good preservation stability is not yet found out.

[0007]This invention solves the above-mentioned problem and an object of this invention is to provide the metallic corrosion prevention method using a drainage system lubricant composition and this excellent in the anti-corrosiveness to nonferrous metal etc., putrescibility-proof, microbial deterioration-proof nature, and preservation stability, such as an aluminum alloy.

[0008]

[The means for solving a technical problem and an embodiment of the invention] As a result of looking for the compound excellent in the anti-corrosiveness to nonferrous metal, putrescibility-proof, microbial deterioration-proof nature, and preservation stability wholeheartedly that the above-mentioned purpose should be attained, this invention persons find out having the performance excellent in the specific organic silicon compound, and came to complete this invention.

[0009]namely, following general formula (1), this invention persons,

$YR^1_m SiR^{2}_{3-m}$ (1) (inside of formula, and R^1 -- substitution of the carbon numbers 1-8, or an unsubstituted monovalent hydrocarbon group.) R^2 is an alkoxy group or an acyloxy group of the carbon numbers 1-4, Y is a nitrogen content organic group, and m is 0 or 1. Hydrolytic Silang containing a nitrogen atom content organic group expressed or its partial hydrolysate 100 weight section, and following general formula (2)

$R^3_n SiR^{4}_{4-n}$ (2) (inside of formula, and R^3 -- substitution of the carbon numbers 1-8, or an unsubstituted monovalent hydrocarbon group.) R^4 An alkoxy group or an acyloxy group of the carbon numbers 1-4, n is 0, 1, or 2. By a very simple method of hydrolyzing a mixture with hydrolytic Silang expressed or its five to partial hydrolysate 200 weight section in an organic solvent containing the above water required for underwater or hydrolysis, are stable in solution. A stable organic silicon compound is especially obtained also within an alkali system, and by adding an oily agent and alkanolamine to this, it excels in anti-corrosiveness, putrescibility-proof, or microbial deterioration-proof nature, and preservation stability also finds out a good drainage system lubricant composition.

[0010]This invention Therefore, the (A) above-mentioned type (hydrolytic Silang (a containing a nitrogen atom content organic group of 1)) or its partial hydrolysate 100 weight section, A drainage system lubricant composition containing hydrolytic Silang organic silicon compound

[which is obtained by hydrolyzing (b) or its partial hydrolysate 5 - 200 weight sections], (B) oiliness agent, and (C) alkanolamine of the above-mentioned formula (2) is provided. A metallic corrosion prevention method, wherein the above-mentioned drainage system lubricant composition is used for this invention and it processes or immerses a metal material is provided.

[0011] Hereafter, lessons is taken from this invention and it explains in more detail. Hydrolytic Silang (a) containing a nitrogen atom content organic group of an organic silicon compound used in order to obtain a drainage system lubricant composition of this invention is an ingredient used in order to make a system into water solubility, and is a following general formula (1).

$YR^1_m SiR^2_{3-m}$ (1) (inside of formula, and R^1 -- substitution of the carbon numbers 1-8, or an unsubstituted monovalent hydrocarbon group.) R^2 is an alkoxy group or an acyloxy group of the carbon numbers 1-4, Y is a nitrogen content organic group, and m is 0 or 1. In order to be expressed and to make water solubility give the target organic silicon compound, its one sort or two sorts or more are selected suitably, and it is used. The partial hydrolysate can also be used.

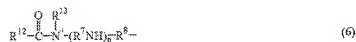
[0012] R^1 is substitution or an unsubstituted monovalent hydrocarbon group which does not contain a nitrogen atom of the carbon numbers 1-8 here, For example, a halogen atom etc. replaced some or all of a hydrogen atom of an alkyl group, an alkenyl group, an aryl group, aralkyl groups, etc. and these bases, an alkyl halide group etc. are mentioned. Specifically - CH_3 , - CH_2CH_3 , and - $CH_2CH_2CH_3$, - $CH(CH_3)_2$, - $CH_2CH_2CH_2CH_3$, - $CH(CH_3)CH_2CH_3$, - $CH_2CH(CH_3)CH_3$, - $C(CH_3)_3$, and - C_6H_5 and - C_6H_{13} etc. are illustrated.

[0013] R^2 is an alkoxy group or an acyloxy group of the carbon numbers 1-4, and specifically, - OCH_3 , - OCH_2CH_3 , and - $OCH_2CH_2CH_3$, - $OCH(CH_3)_2$, - $OCH_2CH_2CH_2CH_3$, - Although $OCH(CH_3)CH_2CH_3$, - $OCH_2CH(CH_3)CH_3$, - $OC(CH_3)_3$, - $OCOCH_3$, - $OCOCH_2CH_3$, etc. are illustrated, it is especially, - OCH_3 and - OC_2H_5 are preferred.

[0014] Y is a nitrogen content organic group, for example, what is shown by following formula (3) - (6) is mentioned.

[0015]

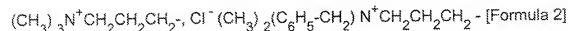
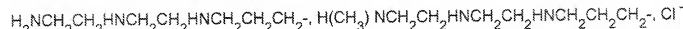
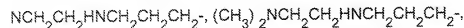
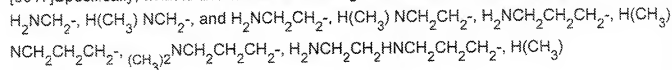
[Formula 1]

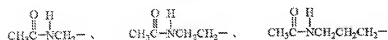
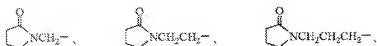


(R^5 , R^6 , R^9 - R^{13} are the monovalent hydrocarbon groups of a hydrogen atom or the carbon numbers 1-8 among a formula, and R^5 , R^6 and R^9 , R^{10} , R^{11} and R^{12} , and R^{13} may be mutually the same, or may differ from each other.) R shows a halogen atom. R^7 and R^8 are the bivalence hydrocarbon groups of the carbon numbers 1-8, and R^7 and R^8 may be mutually the same, or may differ from each other. p is an integer of 0, or 1-3.

[0016] The monovalent hydrocarbon group of the carbon numbers 1-8 is the same as that of what was explained by R^1 . An alkylene group etc. are mentioned as a bivalence hydrocarbon group of the carbon numbers 1-8.

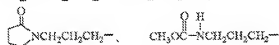
[0017] Specifically, what is shown with a following formula can be mentioned as Y .





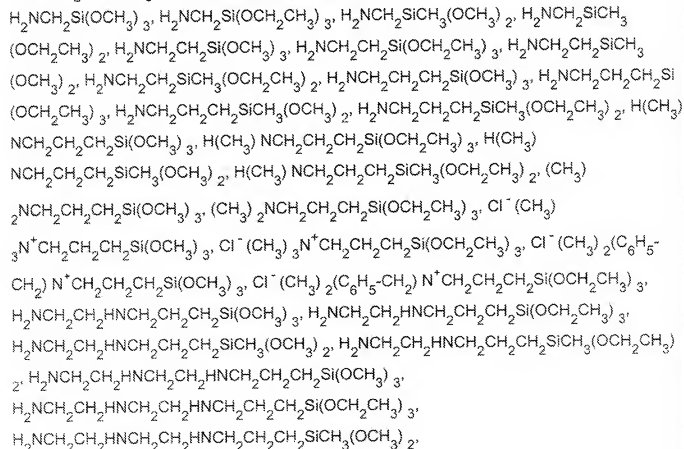
The following are preferred in these.

$\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2$ - [Formula 3]

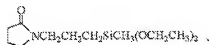
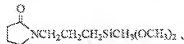
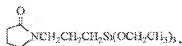
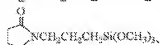


[0018] $m = 0$ or 1 -- it is 0 preferably.

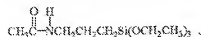
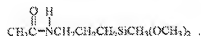
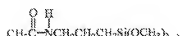
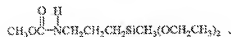
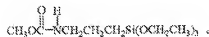
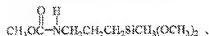
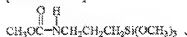
[0019] The following can be illustrated as the above-mentioned formula (hydrolytic Silang (a containing the nitrogen atom content organic group of 1)).



$\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{SiCH}_3(\text{OCH}_2\text{CH}_3)_2$, [Formula 4]



[Formula 5]



In these, preferably especially $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_2\text{CH}_3)_3$, it is $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_2\text{CH}_3)_3$, and these partial hydrolysates may be used.

[0020] On the other hand, hydrolytic Silang (b) which is mixed with above-mentioned hydrolytic Silang (a) or its partial hydrolysate, and is used may be expressed with a following general formula (2), and one of them can be used for it combining independent or two sorts or more,

and it may use the partial hydrolysate.

[0021]

$R^3_n SiR^4_{4-n}$ (2) (as for R^3 , an alkoxy group of the carbon numbers 1-4 or an acyloxy group, and n of substitution of the carbon numbers 1-8 or an unsubstituted monovalent hydrocarbon group, and R^4 are 0, 1, or 2 among a formula.)

[0022] Here, R^3 is substitution or an unsubstituted monovalent hydrocarbon group which does not contain a nitrogen atom of the carbon numbers 1-8, and is the same as that of what was explained by the above-mentioned R^1 . Specifically $-CH_3$, $-CH_2CH_3$, and $-CH_2CH_2CH_3$, $-CH(CH_3)_2$, $-CH_2CH_2CH_2CH_3$, $-CH(CH_3)CH_2CH_3$, $-CH_2CH(CH_3)CH_3$, $-C(CH_3)_3$, and $-C_6H_5$ and $-C_6H_{13}$ etc. are illustrated.

[0023]R⁴ is an alkoxy group or an acyloxy group of the carbon numbers 1-4, and specifically, -OCH₃, -OCH₂CH₃, and -OCH₂CH₂CH₃, -OCH(CH₃)₂, -OCH₂CH₂CH₂CH₃, -OCH(CH₃)CH₂CH₃, -OCH₂CH(CH₃)CH₃, -OC(CH₃)₃, -OCOCH₃, -OCOCH₂CH₃, etc. are illustrated, it is especially, -OCH₃ and -OC₂H₅ are preferred.

[0024] $n = 0, 1$, or 2 -- it is 0 or 1 preferably.

[0025] The following can be illustrated as this formula (hydrolytic Silang (b of 2)).

$$\begin{aligned} & \text{Si}(\text{OCH}_2\text{CH}_3)_4, \text{Si}(\text{OCH}_2\text{CH}_2\text{CH}_3)_4, \text{Si}(\text{OCH}_2\text{CH}_2\text{CH}_2\text{CH}_3)_4, \text{CH}_3\text{Si}(\text{OCH}_2\text{CH}_3)_3, \\ & \text{CH}_3\text{Si}(\text{OCH}_2\text{CH}_2\text{CH}_3)_3, \text{CH}_3\text{Si}(\text{OCH}_2\text{CH}_2\text{CH}_2\text{CH}_3)_3, (\text{CH}_3)_2\text{Si}(\text{OCH}_2\text{CH}_3)_2, \\ & (\text{CH}_3)_2\text{Si}(\text{OCH}_2\text{CH}_2\text{CH}_3)_2, (\text{CH}_3)_2\text{Si}(\text{OCH}_2\text{CH}_2\text{CH}_2\text{CH}_3)_2, \end{aligned}$$

[Formula 6]



They are $\text{Si}(\text{OCH}_3)_4$, $\text{Si}(\text{OCH}_2\text{CH}_3)_4$, $\text{CH}_3\text{Si}(\text{OCH}_3)_3$, $\text{CH}_3\text{Si}(\text{OCH}_2\text{CH}_3)_3$, and these partial hydrolysates especially preferably in these.

[0026] When a formula (hydrolytic Silang (b of 2)) or its partial hydrolysate is mixed and used for hydrolytic Silang (a) containing the above-mentioned nitrogen atom content organic group, or its partial hydrolysate, As opposed to hydrolytic Silang (a) in which the mixture ratio contains a nitrogen atom content organic group, or its partial hydrolysate 100 weight section, It is a rate of hydrolytic Silang (b) or its partial hydrolysate 5 - 200 weight sections, and quantity of hydrolytic Silang (b) or its partial hydrolysate is 10 - 150 weight section more preferably. Since alkalinity in an alkali field will get worse if this quantity exceeds 200 weight sections, it is not desirable.

[0027]When it hydrolyzes using above-mentioned hydrolytic Silang (a), (b), or those partial hydrolysates and obtains an organic silicon compound of this invention, a solvent mainly uses water, but, Alcohol, ester, ketone, and glycols which are water and a dissolving organic solvent can be used in a form added in water if needed. As an organic solvent, methyl alcohol, ethyl alcohol, 1-propyl alcohol, Glycols, such as ketone, such as ester species, such as alcohols, such as 2-propyl alcohol, methyl acetate, ethyl acetate, and ethyl acetoacetate, acetone, and methyl ethyl ketone, glycerin, and a diethylene glycol, can be mentioned.

[0028]Quantity of a solvent has 400 to 5,000 preferred weight section to raw material Silang 100 weight section. It is 1,000 to 3,000 weight section preferably. If there is less quantity of a solvent than 400 weight sections, a reaction may advance too much and a system may not become uniform. The preservation stability of liquid may also worsen. On the other hand, if more than 5,000 weight sections, a case of being economically disadvantageous will arise.

[0029]As for quantity of water in a solvent, 5-50 are preferred at mole fraction of water / raw material Silang. If there is less this mole fraction than five, hydrolysis does not advance easily thoroughly, and the stability of liquid may get worse. On the other hand, if 50 is exceeded, a case of being economically disadvantageous will arise.

[0030]How to trickle (1) mixing Silang as a reaction method into an organic solvent containing water of the above quantity required for underwater or hydrolysis, (2) How to trickle water all over mixed Silang or organic solvent content mixing Silang, (3) Hydrolytic Silang (b) or its partial hydrolysate is dropped into an organic solvent containing water of the above quantity required for underwater or hydrolysis, Then, a method of trickling hydrolytic Silang (a) containing a nitrogen atom content organic group, or its partial hydrolysate, (4) Although hydrolytic Silang (a) containing a nitrogen atom content organic group or its partial hydrolysate is dropped into an organic solvent containing water of the above quantity required for underwater or hydrolysis and a method of trickling hydrolytic Silang (b) or its partial hydrolysate, etc. are mentioned after that, From a point of the stability of an organic silicon compound, a reaction method of (1) is especially preferred.

[0031]Although an obtained organic silicon compound is obtained in a form of solution, adding or removing water and receiving organic silicon compound 100 weight section if needed, -- water -- an organic silicon compound can be formed by adjusting to a ratio of ten to 1,000 weight section preferably ten to 2,000 weight section. In this case, if there is less quantity of water than ten weight sections, the preservation stability of the organic silicon compound itself may get worse. If more than 2,000 weight sections, quantity which adds an organic silicon compound increases and it is not desirable in cost.

[0032]Thus, preservation stability of an obtained organic silicon compound is also high, and it is possible to be able to exist stably, even if it adds to a drainage system lubricant composition in especially an alkaline region, etc. as an additive agent, and also to give many performances,

such as anti-corrosiveness, putrescibility-proof, and microbial deterioration-proof nature.

[0033]As for this organic silicon compound, although a drainage system lubricant composition of this invention contains the above-mentioned organic silicon compound, an oily agent, alkanolamine, and water, it is preferred that it is 0.2 to 3 % of the weight still more preferably 0.1 to 5% of the weight more preferably 0.1 to 10% of the weight of the whole constituent.

[0034]Five to 90% of the weight, ten to 70% of the weight, loadings of an oily agent are 20 to 40 % of the weight preferably, and especially 20 to 50% of the weight still more preferably alkanolamine, It is more preferably preferred that it is 5 to 20 % of the weight still more preferably three to 25% of the weight one to 30% of the weight.

[0035]If there are too few organic silicon compounds, the blending effect will not be acquired enough, but when too large, there is a possibility of causing cost escalation. There is a possibility that lubricity may run short if there are too few oily agents, and when too large, there is a possibility that the stability of a constituent may be spoiled. A case where putrescibility-proof runs short if there is too little alkanolamine arises, and when too large, there is a possibility that skin irritation may become strong.

[0036]Content of water is 1 to 70 % of the weight especially preferably 0.5 to 80% of the weight preferably 0.1 to 90% of the weight. When there is too little quantity of water, if too large, lubricity and metallic corrosion tightness will sometimes become [those with the stability of the (A) ingredient worsening, and] insufficient.

[0037]As the above-mentioned oily agent, (1) capric acid, lauric acid, myristic acid, Pulmitic acid, stearic acid, arachidic acid, behenic acid, oleic acid, Fatty acid, such as erucic acid, linolic acid, linolenic acid, ricinoleic acid, and eleostearic acid, (2) Higher alcohol, such as ester, such as sesame oil, rapeseed oil, a bran oil, cottonseed cake oil, lard, beef tallow, and mutton tallow, (3) lauryl alcohol, myristyl alcohol, cetyl alcohol, stearyl alcohol, and oleyl alcohol, etc. can be mentioned. In addition to higher fatty acid, dodecanedioic acid and middle-class fatty acid about capric acid may be blended. as an oily agent -- especially -- a carbon number of R -- 12 or more -- desirable -- 12-50 -- more -- desirable -- 12-36 -- further -- desirable -- 12-24 -- fatty acid (RCOOH) and alcohol (ROH) of 16-18 are especially preferred.

[0038]As alkanolamine, monoethanolamine, diethanolamine (DEA), triethanolamine (TEA), etc. are mentioned and these one sort can be used combining independent or two sorts or more.

[0039]Base oil, a rust-proofer, a surface-active agent, an antiseptic, a defoaming agent, and other additive agents (for example, an extreme pressure additive, an anticorrosive, a viscosity index improver, an antioxidant, a detergent additive, colorant, perfume, etc.) can be used for this constituent, blending them with it suitably. As the above-mentioned base oil, mineral oil, for example, a machining oil, turbine oil, spindle oil, cylinder oil, etc. can be mentioned. As a water soluble lubricant composition containing base oil, when the whole water soluble lubricant composition is made into 100 weight sections, base oil can consider it as 20 to 50 weight

section still more preferably 20 to 60 weight section preferably 15 to 70 weight section.

[0040]As the above-mentioned rust-proofer, besides an amine compound (alkanolamine) shown above, Especially a carbon number of R' (1) Carboxylic acid (R'COOH) of 6-10. (2) the above-mentioned carboxylate (metal (Ca, Mg, aluminum, and Zn.) of carboxylic acid) salts, such as Pb, carboxylic acid, and amine (the usual monoamine and polyamine.) salts, such as rosinamine and beef tallow amine, and (3) sulfonates (petroleum sulfonic acid.) Dinonylnaphthalene sulfonic acid, heavy alkylbenzene sulfonic acid, etc. and Na, Salts, such as Ca and Ba, (4) ester (partial ester of polyhydric alcohol, such as carboxylic acid, such as oleic acid and lauryl acid, sorbitol, pentaerythritol, sucrose, and glycerin), and others can be mentioned.

[0041]As the above-mentioned surface-active agent, although the Nonion system, an anionic system, a cation system, or a both sexes system surface-active agent can be used, the Nonion system surface-active agent is preferred. This is for the stability of a diluent, and detergency. the Nonion system surface-active agent -- (1) polyoxyethylene system compound (polyoxyethylene alkyl ether.) Polyoxyethylene alkyl phenyl ether, polyoxyethylene alkyl naphthyl ether, Polyoxyethylene-ized castor oil, polyoxyethylene loon ethyl alcohol, Polyoxyethylene alkylthio ether, polyoxyethylene alkylamide, Polyoxyethylene polyoxypropylene glycol, polyoxyethylene polyoxypropylene glycol ethylenediamine. Polyoxyethylene mono- fatty acid ester, polyoxyethylene fatty acid ester, Polyoxyethylene propylene glycol fatty acid ester, polyoxyethylene sorbitan mono- fatty acid ester, Polyoxyethylene SORBITANJI fatty acid ester, polyoxyethylene sorbitan trifatty acid ester, etc., (2) a polyhydric alcohol system compound and an ARUKI roll amide system compound (ethylene glycol mono- fatty acid ester.) Propylene glycol mono- fatty acid ester, glycerin mono- fatty acid ester, pentaerythritol mono- fatty acid ester, sorbitan mono- fatty acid ester, sorbitan sesquifatty acid ester, Sorbitan trifatty acid ester, sucrose fatty acid ester, fatty acid monoethanolamide, fatty acid diethanolamide, etc. can be mentioned.

[0042]as the above-mentioned anionic system surface-active agent -- (1) fatty acid derivatives (fatty acid soap.) Rosin acid soap, naphthenic acid soap, fatty acid SARUKOSHIDO, proteolysis thing fatty acid amide, etc., (2) a sulfate ester system compound (long chain alcoholic sulfuric ester salt and olefin sulfuric ester salt.) Polyoxyethylene-alkyl-ether sulfuric ester salt, fatty acid polyhydric alcohol sulfuric ester salt, etc., (3) a sulfonic acid system compound and a phosphoric ester system compound (an alkane-sulfonic-acid salt.) Petroleum sulfonate, alpha-olefin sulfonate, an alkyl naphthalenesulfonic acid salt, alkyl phosphate, polyoxyethylene alkylphenol ether phosphate, etc. are mentioned. A surface-active agent of the above-mentioned Nonion system and an anionic system can also be used together. A publicly known cation system surface-active agent and a both sexes system surface-active agent can also be used.

[0043] as the above-mentioned antiseptic -- (1) phenol system compound (o-phenylphenol.) Na-o-phenylphenol, 2,3,4,6-tetrachlorophenol, etc., (2) a formaldehyde donor compound (2-hydroxy methyl-2-nitro 1,3-propanediol.) (3), such as hexa high draw 1,3,5-tris (2-hydroxy ethyl)-(s)-triazine, -- in addition to this, it can mention (mixture of tribromosalicylanilide and dibromo salicylanilide, etc.).

[0044] An emulsion of silicone, higher alcohol, etc. can be mentioned as the above-mentioned defoaming agent.

[0045] As for the above-mentioned drainage system lubricant composition, it is preferred to use pH 8-13 and a thing preferably adjusted to eight to about 12. In this case, a pH adjuster in particular is not restricted but can use sodium carbonate, such as chloride, sodium bicarbonate, sodium hydroxide, etc.

[0046] The above-mentioned drainage system lubricant composition is used for a metallic corrosion prevention method of this invention, and it processes or immerses metal materials, such as nonferrous alloys, such as a metal material, for example, aluminum, an aluminum alloy, magnesium, and a Magnesium alloy, with a conventional method.

[0047] In this case, it is effective that a metal material in which pH consists a drainage system lubricant composition containing the above-mentioned organic silicon compound of aluminum or an aluminum alloy using water dilution lye in which the alkali side is shown is processed or immersed especially to aluminum or an aluminum alloy.

[0048]

[Example] Although a synthetic example and an example, and a comparative example are shown and this invention is explained concretely hereafter, this invention is not restricted to the following example.

(1) The synthetic [the synthetic example 1] water 246g (13.7 mol) of the organic silicon compound was put into the 500-ml reactor provided with the agitator, the thermometer, and the condenser, and was agitated. The place which trickled into it at the room temperature having applied for 10 minutes what mixed $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 44.4g (0.2 mol) and $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 20.8g (0.1 mol) here, The internal temperature rose from 25 ° to 56 °. It heated at 60-70 ° in the oil bath, and churning was performed as it was for 1 hour. Next, organic silicon compound-1 [250g] was obtained by attaching an ester adapter, raising to the internal temperature of 99 °, and removing methanol and ethanol which carried out the byproduction. The nonvolatile matter (105 °/3 hours) of this thing was 14.9%.

[0049] [Synthetic example 2] The water 278g (15.4 mol) was put into the 500-ml reactor provided with the agitator, the thermometer, and the condenser, and was agitated. What mixed $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 55.6g (0.25 mol) and $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 10.4g (0.05 mol) here. When it applied for 10 minutes and was dropped at the room temperature, the

internal temperature rose from 27 ** to 49 **. It heated at 60-70 ** in the oil bath, and churning was performed as it was for 1 hour. Next, organic silicon compound-2 [274g] was obtained by attaching an ester adapter, raising to the internal temperature of 98 **, and removing methanol and ethanol which carried out the byproduction. The nonvolatile matter (105 **/3 hours) of this thing was 15.1%.

[0050][Synthetic example 3] Agitation mixing of the water 202g (11.2 mol) was put in and carried out to the 500-ml reactor provided with the agitator, the thermometer, and the condenser. What mixed $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 33.3g (0.15 mol) and $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 31.2g (0.15 mol) here. When it applied for 10 minutes and was dropped at the room temperature, the internal temperature rose from 25 ** to 51 **. It heated at 60-70 ** in the oil bath, and churning was performed as it was for 1 hour. Next, organic silicon compound-3 [210g] was obtained by attaching an ester adapter, raising to the internal temperature of 99 **, and removing methanol and ethanol which carried out the byproduction. The nonvolatile matter (105 **/3 hours) of this thing was 15.3%.

[0051][Synthetic example 4] Agitation mixing of the water 308g (17.1 mol) was put in and carried out to the 500-ml reactor provided with the agitator, the thermometer, and the condenser. Here $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 53.1g (0.2 mol) and $\text{Si}(\text{OCH}_3)_4$ 15.2g (0.1 mol). When dropped at the room temperature, having applied the mixed thing for 10 minutes, the internal temperature rose from 28 ** to 53 **. It heated at 60-70 ** in the oil bath, and churning was performed as it was for 1 hour. Next, organic silicon compound-4 [300g] was obtained by attaching an ester adapter, raising to the internal temperature of 99 **, and removing the methanol which carried out the byproduction. The nonvolatile matter (105 **/3 hours) of this thing was 15.4%.

[0052][Synthetic example 5] Agitation mixing of the water 253g (14.1 mol) was put in and carried out to the 500-ml reactor provided with the agitator, the thermometer, and the condenser. The place which trickled into it at the room temperature having applied for 10 minutes what mixed $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 44.4g (0.2 mol) and $\text{CH}_3\text{Si}(\text{OCH}_3)_3$ 13.6g (0.1 mol) here. The internal temperature rose from 26 ** to 42 **. It heated at 60-70 ** in the oil bath, and churning was performed as it was for 1 hour. Next, organic silicon compound-5 [244g] was obtained by attaching an ester adapter, raising to the internal temperature of 99 **, and removing the methanol which carried out the byproduction. The nonvolatile matter (105 **/3 hours) of this thing was 15.6%.

[0053][Synthetic example 6] Agitation mixing of the water 241g (13.4 mol) was put in and carried out to the 500-ml reactor provided with the agitator, the thermometer, and the condenser. Here $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 44.4g (0.2 mol), When dropped at

the room temperature, having applied for 10 minutes what mixed $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 18.7g (0.09 mol) and $\text{CH}_3\text{Si}(\text{OCH}_3)_3$ 1.4g (0.01 mol), the internal temperature rose from 26 ° to 49 °. It heated at 60-70 ° in the oil bath, and churning was performed as it was for 1 hour. Next, organic silicon compound-6 [241g] was obtained by attaching an ester adapter, raising to the internal temperature of 99 °, and removing the methanol which carried out the byproduction. The nonvolatile matter (105 °/3 hours) of this thing was 15.7%.

[0054][Synthetic example 7] Agitation mixing of the water 246g (13.7 mol) was put in and carried out to the 500-ml reactor provided with the agitator, the thermometer, and the condenser. When it was dropped at it at the room temperature, having bet $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 44.4g (0.2 mol) here for 10 minutes, the internal temperature rose from 25 ° to 52 °. After carrying out agitation mixing for 30 minutes as it is, $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 20.8g (0.1 mol) was dropped further. It heated at 60-70 ° in the oil bath after dropping, and churning was performed as it was for 1 hour. Next, organic silicon compound-7 [248g] was obtained by attaching an ester adapter, raising to the internal temperature of 98 °, and removing methanol and ethanol which carried out the byproduction. The nonvolatile matter (105 °/3 hours) of this thing was 14.7%.

[0055](2) In order to clarify performance of metal processing service-water solubility lubricant of presentation this invention of a water soluble lubricant composition, the system performance testing and evaluation of each item described below about the sample solution (a unit is a weight section) of Examples 1-13 and the comparative examples 1-5 which have each ingredient shown in Tables 1 and 2 were performed. In Tables 1 and 2, as base oil, used spindle oil, the polyoxyethylene alkyl ether of the Nonion system surface-active agent was used as a surface-active agent, and the silicone series defoaming agent was used as a defoaming agent.

[0056]

[Table 1]

成分(重量部)	実施例							
	1	2	3	4	5	6	7	8
アクリ酸	30	30	30	30	30	30	30	30
ジメチルアクリレート	5	5	5	5	5	5	5	5
DEA	12	12	12	12	12	12	12	12
TBA	6	6	6	6	6	6	6	6
有機ケイ素化合物-1	7							
有機ケイ素化合物-2		7						
有機ケイ素化合物-3			7					
有機ケイ素化合物-4				4				
有機ケイ素化合物-5					7			
有機ケイ素化合物-6						7		7
有機ケイ素化合物-7							7	
$\text{H}_2\text{N}-\text{C}_6\text{H}_4-\text{NHC}_6\text{H}_4-\text{Si}(\text{OCH}_3)_2$								
$\text{Si}(\text{OCH}_3)_4$								
炭油								
アクリル系界面活性剤	2	2	2	2	2	2	2	
防錆剤	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
増粘剤	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
水	50.1	50.1	50.1	50.1	50.1	50.1	50.1	50.1
pH	11.1	11.2	11.1	10.9	11.5	11.1	11.0	11.0

Notes: The addition of an organic silicon compound is an addition as a thing containing the water obtained in the above-mentioned synthetic example.

The addition as a nonvolatile matter is calculated from the addition of Table 1, and the nonvolatile matter content in each synthetic example (following, the same).

[0057]

[Table 2]

成分(重量部)	実施例			比較例				
	9	10	11	1	2	3	4	5
アクリ酸	30	40	30	30	30	30	20	30
ジメチルアクリレート	3			3	3	3	3	3
DEA	26	12	12	12	12	12	17	
TBA		5	5	5	5	5		20
有機ケイ素化合物-1		6	7					
有機ケイ素化合物-2								
有機ケイ素化合物-3								
有機ケイ素化合物-4	9							
有機ケイ素化合物-5								
有機ケイ素化合物-6		4						
有機ケイ素化合物-7								
$\text{H}_2\text{N}-\text{C}_6\text{H}_4-\text{NHC}_6\text{H}_4-\text{Si}(\text{OCH}_3)_2$					1			
$\text{Si}(\text{OCH}_3)_4$						1	10	
炭油		15	40					
アクリル系界面活性剤	2	2	2	2	2	2	2	2
防錆剤	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
増粘剤	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
水	1.1	19.1	3.1	57.1	58.1	58.1	47.1	54.1
pH	11.7	11.0	10.9	11.1	11.0	11.8	11.1	11.0

[0058](3) The test item and performance evaluation method of quality assessment book system performance testing are as follows.

anti-corrosiveness and preservation stability book system performance testing -- duralumin (Cu -- 4%) of aluminum (JIS A1050P) and an aluminum alloy (JIS A2017P) After having ground Mg0.5% of specimen (50x30x1 mm) with #320 abrasive paper, adding sulfuric acid to the 20

times much water [as] diluent of the sample solution and adjusting the pH of the above-mentioned diluent to 9.0, it was half-immersed at ordinary temperature and viewing estimated the discoloration degree of the specimen of 24 hours after. the display of evaluation -- O:discoloration nothing and O: -- a few -- discoloration and x: -- discoloration is expressed black. A result is shown in Table 3. The again same anti-corrosiveness examination as the above was done for the drainage system lubricant composition prepared by the example and the comparative example after one-month preservation at 60 **. The result is also shown in Table 3.

Putrescibility-proof book system performance testing estimated putrescibility-proof by measurement of the number of micro organisms. First, the sample solution was diluted 20 times with water, and 300 ml was extracted to a 500-ml Erlenmeyer flask. Subsequently, after adding sulfuric acid to this and adjusting the pH of the above-mentioned diluent to 9.0, the putrefaction liquid of a number-of-micro-organisms 1×10^7 individual / ml was added 5% (15 ml), and shaking culture was carried out at 30 **. Putrefaction liquid was added 1% each (3 ml) after the start of test on the 14th on the 7th, respectively, and the change with time of the number of micro organisms was observed. The result is shown in Table 4. Measurement of the number of micro organisms was performed by the plate counting method.

In the microbial deterioration-proof nature true-character ability examination, measurement of the coefficient of friction by a Soda style pendulum molding lubricant sex-test machine performed lubricative evaluation before and behind a microorganism deterioration test. First, the sample solution was diluted 20 times with water. Subsequently, the lubricity after having added the putrefaction liquid of a number-of-micro-organisms 1×10^7 individual / ml 1% of the weight, having carried out shaking culture for one month at 30 **, after adding sulfuric acid to this and adjusting the pH of the above-mentioned diluent to 9.0, and promoting microbial deterioration was evaluated. A result is shown in Table 5.

[0059]

[Table 3]

	防食性(初期)		防食性(90℃/1ヶ月後)	
	70℃/24h	70℃/24h	70℃/24h	70℃/24h
実施例-1	◎	◎	◎	◎
実施例-2	◎	◎	◎	◎
実施例-3	◎	◎	◎	◎
実施例-4	◎	◎	◎	◎
実施例-5	◎	◎	◎	◎
実施例-6	◎	◎	◎	◎
実施例-7	◎	◎	◎	◎
実施例-8	◎	◎	◎	◎
実施例-9	◎	◎	◎	◎
実施例-10	◎	◎	◎	◎
実施例-11	◎	◎	◎	◎
比較例-1	×	×	×	×
比較例-2	◎	◎	×	×
比較例-3	○	○	×	×
比較例-4	◎	◎	×	×
比較例-5	○	○	○	○

[0060]

[Table 4]

	生菌数 (個/ml)				
	5日	10日	15日	20日	30日
実施例-1	<10 ³	<10 ³	<10 ³	<10 ³	<10 ³
実施例-2	<10 ³	<10 ³	<10 ³	<10 ³	<10 ³
実施例-3	<10 ³	<10 ³	<10 ³	<10 ³	<10 ³
実施例-4	<10 ³	<10 ³	<10 ³	<10 ³	<10 ³
比較例-1	<10 ³	<10 ³	<10 ³	<10 ³	<10 ³
比較例-2	<10 ³	<10 ³	<10 ³	<10 ³	<10 ³
比較例-3	<10 ³	<10 ³	<10 ³	<10 ³	<10 ³
比較例-4	<10 ³	<10 ³	<10 ³	<10 ³	<10 ³
比較例-5	<10 ³	<10 ³	2×10 ³	8×10 ³	8×10 ³

[0061]

[Table 5]

	腐敗指数	
	酸化値	硫化値
実施例-1	0.11	0.12
実施例-2	0.12	0.13
実施例-3	0.11	0.12
実施例-4	0.12	0.12
比較例-1	0.12	0.12
比較例-2	0.12	0.12
比較例-3	0.13	0.13
比較例-4	0.12	0.12
比較例-5	0.12	0.15

[0062]

[Effect of the Invention] The drainage system lubricant composition of this invention is excellent in the anti-corrosiveness to nonferrous metal etc., putrescibility-proof, microbial deterioration-proof nature, and preservation stability, such as an aluminum alloy, and its balance of performance is very good. According to the metallic corrosion method of this invention, the corrosion in the case of processing with the lye which an aluminum alloy etc. tend to corrode can be prevented easily and efficiently.

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EFFECT OF THE INVENTION

[Effect of the Invention]The drainage system lubricant composition of this invention is excellent in the anti-corrosiveness to nonferrous metal etc., putrescibility-proof, microbial deterioration-proof nature, and preservation stability, such as an aluminum alloy, and its balance of performance is very good. According to the metallic corrosion method of this invention, the corrosion in the case of processing with the lye which an aluminum alloy etc. tend to corrode can be prevented easily and efficiently.

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TECHNICAL PROBLEM

[Description of the Prior Art]Phosphoric ester, an amide compound, etc. are known as a compound which controls the corrosion of nonferrous metal, such as an aluminum alloy. [0004]However, when these compounds are applied to drainage system lubricant, there are few anticorrosive effects. In the drainage system lubricant used for cutting, grinding, etc., although generally used as a water diluent, generally the pH of the liquid is an alkali side, and if pH becomes nine or more, the corrosion of nonferrous metal, such as an aluminum alloy, will take place. As a result, pH must be suppressed to nine or less and putrescibility-proof and rust prevention fall. In the water soluble lubricants containing Lynn, such as phosphoric ester, there is a problem that degradation by a microorganism is early.

[0005]In JP,61-60766,A and JP,9-194872,A, the method of adding an organic group content alkoxy silane compound like a silane coupling agent is indicated that the above problems should be solved. However, since these are monomer components, it is [membrane-formation-] hard to use during cutting, and there is an early anticorrosive effect, but there is a fault that the durability is bad. Since the inside of a system was alkaline when a silane compound ingredient is added in lubricant so much, in order to heighten the effect, it gelled immediately and there was a problem that preservation stability got worse shortly.

[0006]Therefore, the actual condition is that excel in the anti-corrosiveness, the putrescibility-proof, and microbial deterioration-proof nature to nonferrous metal etc., such as an aluminum alloy, and the drainage system lubricant composition with good preservation stability is not yet found out.

[0007]This invention solves the above-mentioned problem and an object of this invention is to provide the metallic corrosion prevention method using a drainage system lubricant composition and this excellent in the anti-corrosiveness to nonferrous metal etc., putrescibility-proof, microbial deterioration-proof nature, and preservation stability, such as an aluminum alloy.

[0008]

[The means for solving a technical problem and an embodiment of the invention] As a result of looking for the compound excellent in the anti-corrosiveness to nonferrous metal, putrescibility-proof, microbial deterioration-proof nature, and preservation stability wholeheartedly that the above-mentioned purpose should be attained, this invention persons find out having the performance excellent in the specific organic silicon compound, and came to complete this invention.

[0009]Namely, the following general formula (1), this invention persons

$YR^1_mSiR^{2}_{3-m}$ (1) (inside of formula, and R^1 -- the substitution of the carbon numbers 1-8, or

an unsubstituted monovalent hydrocarbon group.) R^2 is the alkoxy group or acyloxy group of the carbon numbers 1-4, Y is a nitrogen content organic group, and m is 0 or 1. Hydrolytic Silang containing the nitrogen atom content organic group expressed or its partial hydrolysate 100 weight section, and following general formula (2)

$R^3_nSiR^{4}_{4-n}$ (2) (inside of formula, and R^3 -- substitution of the carbon numbers 1-8, or an

unsubstituted monovalent hydrocarbon group.) R^4 An alkoxy group or an acyloxy group of the carbon numbers 1-4, n is 0, 1, or 2. By a very simple method of hydrolyzing a mixture with hydrolytic Silang expressed or its five to partial hydrolysate 200 weight section in an organic solvent containing the above water required for underwater or hydrolysis, are stable in solution, A stable organic silicon compound is especially obtained also within an alkali system, and by adding an oily agent and alkanolamine to this, it excels in anti-corrosiveness, putrescibility-proof, or microbial deterioration-proof nature, and preservation stability also finds out a good drainage system lubricant composition.

[0010]This invention Therefore, the (A) above-mentioned type (hydrolytic Silang (a containing a nitrogen atom content organic group of 1)) or its partial hydrolysate 100 weight section, A drainage system lubricant composition containing hydrolytic Silang organic silicon compound [which is obtained by hydrolyzing (b) or its partial hydrolysate 5 - 200 weight sections], (B) oiliness agent, and (C) alkanolamine of the above-mentioned formula (2) is provided. A metallic corrosion prevention method, wherein the above-mentioned drainage system lubricant composition is used for this invention and it processes or immerses a metal material is provided.

[0011]Hereafter, lessons is taken from this invention and it explains in more detail. hydrolytic Silang containing a nitrogen atom content organic group of an organic silicon compound used in order to obtain a drainage system lubricant composition of this invention -- it is an ingredient used in order that (a) may make a system water solubility -- following general formula (1)

$YR^1_mSiR^{2}_{3-m}$ (1) (inside of formula, and R^1 -- substitution of the carbon numbers 1-8, or an

unsubstituted monovalent hydrocarbon group.) R^2 is an alkoxy group or an acyloxy group of the carbon numbers 1-4, Y is a nitrogen content organic group, and m is 0 or 1. In order to be expressed and to make water solubility give the target organic silicon compound, its one sort or two sorts or more are selected suitably, and it is used. The partial hydrolysate can also be used.

[0012] R^1 is substitution or an unsubstituted monovalent hydrocarbon group which does not contain a nitrogen atom of the carbon numbers 1-8 here, For example, a halogen atom etc. replaced some or all of a hydrogen atom of an alkyl group, an alkenyl group, an aryl group, aralkyl groups, etc. and these bases, an alkyl halide group etc. are mentioned. Specifically - CH_3 , - CH_2CH_3 , and - $CH_2CH_2CH_3$, - $CH(CH_3)_2$, - $CH_2CH_2CH_2CH_3$, - $CH(CH_3)CH_2CH_3$, - $CH_2CH(CH_3)CH_3$, - $C(CH_3)_3$, and - C_6H_5 and - C_6H_{13} etc. are illustrated.

[0013] R^2 is an alkoxy group or an acyloxy group of the carbon numbers 1-4, and specifically, - OCH_3 , - OCH_2CH_3 , and - $OCH_2CH_2CH_3$, - $OCH(CH_3)_2$, - $OCH_2CH_2CH_2CH_3$, - Although $OCH(CH_3)CH_2CH_3$, - $OCH_2CH(CH_3)CH_3$, - $OC(CH_3)_3$, - $OCOCH_3$, - $OCOCH_2CH_3$, etc. are illustrated, it is especially. - OCH_3 and - OC_2H_5 are preferred.

[0014] Y is a nitrogen content organic group, for example, what is shown by following formula (3) - (6) is mentioned.

[0015]

[Formula 1]

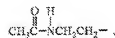
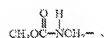
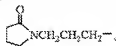
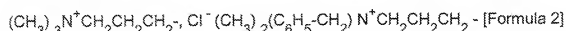
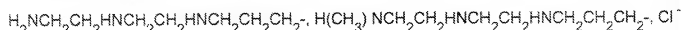
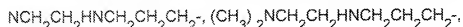
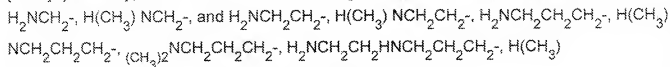


(R^5 , R^6 , R^9 - R^{13} are the monovalent hydrocarbon groups of a hydrogen atom or the carbon numbers 1-8 among a formula, and R^5 , R^6 and R^9 , R^{10} , R^{11} and R^{12} , and R^{13} may be mutually the same, or may differ from each other.) R shows a halogen atom. R^7 and R^8 are the

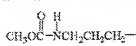
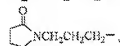
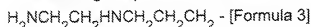
bivalence hydrocarbon groups of the carbon numbers 1-8, and R^7 and R^8 may be mutually the same, or may differ from each other. p is an integer of 0, or 1-3.

[0016] A monovalent hydrocarbon group of the carbon numbers 1-8 is the same as that of what was explained by R^1 . An alkylene group etc. are mentioned as a bivalence hydrocarbon group of the carbon numbers 1-8.

[0017] Specifically, what is shown with a following formula can be mentioned as Y.



The following are preferred in these.



[0018] m -- 0 or 1 -- it is 0 preferably.

[0019] The following can be illustrated as the above-mentioned formula (hydrolytic Silang (a containing the nitrogen atom content organic group of 1)).

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EXAMPLE

[Example]Although a synthetic example and an example, and a comparative example are shown and this invention is explained concretely hereafter, this invention is not restricted to the following example.

(1) The synthetic [the synthetic example 1] water 246g (13.7 mol) of the organic silicon compound was put into the 500-ml reactor provided with the agitator, the thermometer, and the condensator, and was agitated. The place which trickled into it at the room temperature having applied for 10 minutes what mixed $\text{H}_2\text{NCH}_2\text{CH}_2\text{HNCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$ 44.4g (0.2 mol) and $\text{Si}(\text{OCH}_2\text{CH}_3)_4$ 20.8g (0.1 mol) here, The internal temperature rose from 25 ** to 56 **. It heated at 60-70 ** in the oil bath, and churning was performed as it was for 1 hour. Next, organic silicon compound-1 [250g] was obtained by attaching an ester adapter, raising to the internal temperature of 99 **, and removing methanol and ethanol which carried out the byproduction. The nonvolatile matter (105 **/3 hours) of this thing was 14.9%.

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CLAIMS

[Claim(s)]

[Claim 1](A) A following general formula (1)

$YR^1_m SiR^2_{3-m}$ (1) (inside of formula, and R^1 -- substitution of the carbon numbers 1-8, or an unsubstituted monovalent hydrocarbon group.) R^2 is an alkoxy group or an acyloxy group of the carbon numbers 1-4, Y is a nitrogen content organic group, and m is 0 or 1. Hydrolytic Silang containing a nitrogen atom content organic group expressed or its partial hydrolysate 100 weight section, and a following general formula (2)

$R^3_n SiR^4_{4-n}$ (2) (inside of formula, and R^3 -- substitution of the carbon numbers 1-8, or an unsubstituted monovalent hydrocarbon group.) R^4 is an alkoxy group or an acyloxy group of the carbon numbers 1-4, and n is 0, 1, or 2. An organic silicon compound obtained by hydrolyzing hydrolytic Silang expressed or its five to partial hydrolysate 200 weight section, (B) An oily agent, a drainage system lubricant composition containing (C) alkanolamine.

[Claim 2](A) Oily agent 5 of 0.1 to 10 % of the weight and an organic silicon compound (B) ingredient of an ingredient - alkanolamine 1 of 90 % of the weight and the (C) ingredient - 30 % of the weight, (D) water The drainage system lubricant composition containing 0.1 to 90 % of the weight according to claim 1.

[Claim 3]The drainage system lubricant composition according to claim 1 or 2 whose pH is 8-13.

[Claim 4]A metallic corrosion prevention method by which using a drainage system lubricant composition of claim 1 thru/or 3 given in any 1 paragraph, and a metal material being processed or immersed.

[Claim 5]The metallic corrosion prevention method according to claim 4 whose metal material is aluminum or an aluminum alloy raw material.